Mathematics Teacher Retention

Axelle Faughn and Barbara Pence

The main question addressed in this Discussion Group is whether professional development can have a positive effect on the retention of mathematics teacher, and if so what is the nature of professional development that leads to teacher retention and how (what are the mechanisms by which) such professional development supports teacher retention.

Background information, literature on Mathematics Teacher Retention, and important guiding questions were listed on the Discussion Group Website at https://sites.google.com/a/cmpso.org/icme2012/ for participants to actively engage in discussions guided through individual contributions by researchers from Israel, New Zealand, Norway, South Africa, India, and the United States. The major theme of *Supporting mathematics teachers*: *Transition into the workplace and professional development* underlined all discussions. Sub-themes were classified under seven major strands: (1) Mathematics Content and Pedagogy, including Technology; (2) Models of Support; (3) Communities of Practice, including online and lesson study; (4) Teacher Leadership; (5) Research; (6) Policy; (7) Mathematics Teacher Identity. Discussion group organizers were also interested in the magnitude of teacher retention issues in various countries, as well as their local and global impact on mathematics education.

Initial discussions included concerns about what happens at the pre-service level. Choosing teaching training is often a last choice for students, which makes producing qualified teachers a challenge. Many participants indicated trends towards an increasingly diverse range of people choosing teaching as a career choice.

Organizers Co-chairs: Axelle Faughn (USA); Barbara Pence (USA); Team Members: Glenda Anthony (NZ), Mellony Graven (South Africa), Claire V. Berg (Norway); Liasion IPC Member: Oh Nam Kwon (Korea).

A. Faughn (✉)
Western Carolina University, Cullowhee, USA
e-mail: afaughn@email.wcu.edu

B. Pence
San Jose State University, San Jose, USA
e-mail: barbara.pence@sjsu.edu

S.J. Cho (ed.), *The Proceedings of the 12th International Congress on Mathematical Education*, DOI 10.1007/978-3-319-12688-3_73

In countries such as NZ mathematics teachers recruits included an increasing number of career switchers who did not necessary regard teaching as a life-long career. In other countries such as SA, the critical shortages of mathematics recruits and subsequent high number of out-of-field teachers contributed to high attrition rates. In the United States, 50 % of teachers leave within their first 5 years of teaching, and the mode for teaching expectancy of beginning mathematics teachers is 1 year. Problems contributing to teacher attrition that were highlighted included the inappropriate or challenging placement of new teachers, and the rise in number of unqualified teachers teaching mathematics.

Karsenty described a model of support for new teachers of at-risk students in Israel (SHLAV) based on weekly on-site meetings with a mentor. The support in this model was personalized and included discussions on material/content, teaching strategies, and affective issues of students at risk. Through this support model, mentees felt empowered and gained confidence, but the questions of sustainability of such a model was raised in light of cost-effectiveness and what happens once funds for such programs run out. The idea of fostering deep changes in the school through material sharing and networking to form a community that shares information and resources was put forward as an answer to sustainable change.

Graven noted that support in the form of one day training sessions which negate teacher experiences and communicate a 'fix-it' type of approach based on giving teachers new ways of teaching undermines teacher confidence. In South Africa, 55 % of teachers say they would leave if they could. Emphasizing life-long learning as a continuous professional process and redefining one's identity from hiding shame of not knowing to acknowledging one-selves as life-long learners while knowing where to ask should be embedded in professional development interventions. Other components of successful professional development include providing teacher autonomy, fostering a sense of belonging, empowering through increased confidence, which all bring sustainable changes in practice. The question of sustainability through teacher leadership and promotion was raised, as well as the development of a strong professional identity through leadership. Questions linking teacher retention and identity were also considered.

Common themes across different contexts concerned a lack of qualified mathematics teachers, difficulty with recruitment of quality teachers, and teacher dissatisfaction with the profession. East Asian, where the status of teachers in the society is still high and salaries competitive, were noticeably absent from this discussion. In contrast to interventions that offer 'add on' support, East Asian countries offer systemic opportunities and expectations for teachers to grow and to advance in their professions. China has a well-established and coherent professional development system through the use of teaching researchers who serve as collaborators, facilitators and mentors, and get involved at different levels of teaching research activities by developing research lessons. This is the basis of an intricate ranking and promotion system that includes lesson competitions and ensures that

theory is implemented and tested in the classroom. Teachers in East Asia are actively involved at every level of the teaching profession, from training of pre-service teachers, to development of curricular material and delivery of professional development. Madhana Rao described a two-tiered educational system in the district of Warangal of Andhra Pradesh State of India where private institutions are linked to teacher attrition while government schools retain 100 % teachers. Stability in this case is also attributed to a state-led system that provides promotional opportunities and a regular salary to teachers, with professional development interventions.

Participants from other countries reported that teachers who want to become leaders and see their influence increase do not always have the institutional support to do so. When Australian teachers reach the top of the pay scale after 10 years of teaching they can only be promoted as administrators. Anthony examined New Zealand's induction system with time allotted for mentees and mentors to meet regarding concerns pertaining to the teaching profession such as learning about school context, completion of accreditation requirements, and the necessity and tools to become a professional inquirer. The mandated induction program with extra time for planning and support for Year 1 and 2 beginning teachers is a significant factor in low attrition rates. However, the development of a wider community base of support in teacher education programs is necessary to help inform and equip pre-service teachers to proactively counter dissatisfaction and disappointment with the profession and the nature of school culture.

Berg's model is a community of inquiry that aims at replicating material and teaching processes introduced during workshops into the classroom, such as asking good questions during an inquiry activity. Two participating groups qualified as "New Comers" and "Old Timers" showed different levels of appreciation for the professional development, which brings up the question of what is a minimum length for a professional development project to induce sustained change in classroom practices. In this project participants found a community and support outside of their school, a situation echoed by Pence in the California-based Supporting Teachers to Increase Retention project. Pence provided a glimpse on 10 professional development site models aimed at supporting teachers and increase retention. Findings from the project included the emergence of professional communities across all sites and the importance of leadership in keeping teachers motivated and involved. The professional development model for each site was targeted over multiple years, content specific, challenging, and went beyond mathematics content and pedagogy to focus on establishing teaching as a "noble" profession requiring work and preparation, growth that is complex, on-going, and supports the realization that there is a great deal to learn.

Contributions

Contributions to this Discussion group can be found at https://sites.google.com/a/cmpso.org/icme2012/